an array of proximity sensing means embedded in the surface;

scanning means for forming digital proximity images from the proximities measured by the sensing means;

image segmentation means for collecting into groups those proximity image pixels intensified by contact of the same distinguishable part of a hand;

contact tracking means for parameterizing hand contact features and trajectories as the contacts move across successive proximity images;

contact identification means for determining which hand and which part of the hand is causing each surface contact;

synchronization detection means for identifying subsets of identified contacts which touchdown or liftoff the surface at approximately the same time, and for generating command signals in response to synchronous taps of multiple fingers on the surface;

typing recognition means for generating intended key symbols from asynchronous finger taps;

motion component extraction means for compressing multiple degrees of freedom of multiple fingers into degrees of freedom common in two and three dimensional graphical manipulation;

chord motion recognition means for generating one of command and cursor manipulation signals in response to motion in one or more extracted degrees of freedom by a selected combination of fingers;

pen grip detection means for recognizing contact arrangements which resemble the configuration of the hand when gripping a pen, generating inking signals from motions of the inner fingers, and generating cursor manipulation signals from motions of the palms while the inner fingers are lifted; and

communication means for sending the sensed configurations and activities of finger and palms to one of the electronic and electro-mechanical device.

27. A multi-touch surface apparatus for sensing diverse configurations and activities of fingers and palms of one or more hands near the surface and generating integrated manual input to one of an electronic or electro- mechanical device, the apparatus comprising:

an array of proximity sensing means embedded in the surface;

scanning means for forming digital proximity images from proximities measured by the sensing means;

contact segmentation means for collecting proximity image pixels caused by the same hand part into groups;

contact tracking means for parameterizing hand contact features and trajectories as the contacts move across successive proximity images;

contact identification means for determining which hand and which part of the hand is causing each surface contact;

synchronization detection means for identifying subsets of identified contacts which touchdown or liftoff the surface at approximately the same time;

typing recognition means for generating intended key symbols from asynchronous finger taps;

motion component extraction means for compressing the dozens of degrees of freedom in motions of multiple fingers into the degrees of freedom common in two and three dimensional graphical manipulation;

chord motion recognition means for generating command or cursor manipulation signals in response to motion in one or more extracted degrees of freedom by a selected combination of fingers; and

communication means for sending said generated input signals to the electronic or electro-mechanical device.

28. A multi-touch surface apparatus for sensing diverse configurations and activities of fingers and palms of one or more hands near the surface and generating integrated manual input to one of an electronic or electro- mechanical device, the apparatus comprising:

an array of proximity sensing means embedded in the surface;

scanning means for forming digital proximity images from proximities measured by the sensing means;

contact segmentation means for collecting proximity image pixels caused by the same hand part into groups;

contact tracking means for parameterizing hand contact features and trajectories as the contacts move across successive proximity images;

contact identification means for determining which hand and which part of the hand is causing each surface contact;

pen grip detection means for recognizing contact arrangements which resemble the configuration of the hand when gripping a pen, generating inking signals from motions of the inner fingers, and generating cursor manipulation signals from motions of the palms while the inner fingers are lifted; and

communication means for sending said generated input signals to the electronic or electro-mechanical device.

29. The multi-touch surface apparatus of claim 25, wherein the symbols printed on the dielectric cover can be removed and replaced with an alternative symbol set.

30. The multi-touch surface apparatus of claim 25, wherein the dielectric cover has conductive fibers therein, the conductive fibers being oriented normal to the array of sensing devices for conducting the capacitive effect of the touch devices on the array of sensing devices.

31. A multi-layer cover apparatus for the multi-touch surface apparatus of claim 25, the multi-layer cover apparatus comprising:

a compliant dielectric layer;

a deformable conductive layer formed on the dielectric layer, the conductive layer being electrically coupled to the voltage or current measurement device; and

a touch layer formed on the conductive layer.